February 12, 1955

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Dear Herman:

Pardon me for running off so suddenly at the airport to catch the earlier plane. It was not only a matter of time, but a precaution against the Madison field closing down, which might have happened later. It turned out that the front had not yet reached Madison, and the flight although terribly bumpy was not delayed.

I had a very good time during my visit, am sorry it had to be so hurried. We may try to drive up during the spring for a more leisurely visit.

You probably remember our discussion of the anaerogenic mutants of E. coli selected by resistance to chloroacetate. I am enclosing a new one, selected on nutrient agar + chloroacetamide, 2 mg/ml (sic). Apparently one can get away with autoclaving the amide (10% aq.) for later supplementation; I am not so sure about the acid, even if neutralized. This mutant is recorded as W-2754. It was obtained from K-12 (lambda-sensitive) and should be strictly comparable with it except for the " Cla^r " mutation.

The literature on this bug is rather confusing; the only important papers (unless there is some later work I have not been able to find) are these three:

1. Penfold, W.J. 1913 Jour. Hyg. 13:35
2. Harden, A. and Penfold, W.J. Proc. Roy. Soc. Lond., B85: 415
3. Grey, E.C. 1914 ib. 87: 461, 472
(4. 1924 ib. 96:156 and others listed at 103:320).

The first two give the Cla^r as anaerogenic on glucose (let me call this a, but ag+ on mannitol, etc., and formate. I have had no trouble confirming this and W-2754 agrees. Grey mentions another type as formate ag-, but he got this from a different strain; Penfold also mentions a formate ag- obtained with ethylene chlorhydrin. I have <u>not</u> been able to confirm this, but will keep a lookout for it.

Grey's later papers are not very useful, but he does point out 1) that the block may relate to rH, since mannitol behaves differently [one should test whether pyruvate is itself dissimilated in the presence of mannitol], and 2) an odd result that warrants confirmation, that citrate, among others, can be "fermented" by coli in the presence of formate.

Looking over my old notes and these papers (I had overlooked Grey before), I feel a great temptation to delve into the chemistry of this odd mutant, but as I told you I had better stick to my knitting. If you can turn up something really interesting with it, I should clean up the genetic loose ends [indirect selection] mapping]. I did not do much myself beyond what was described earlier, though I played about rather fruitlessly with acetate as a differential carbon source, and I have one experiment in which gas production from pyruvate was tested, and found deficient in the mutant.

There is one thing I should finish up, a differential medium to isolate formate-negative mutants, and try to confirm that part of the old story.

It may help if I recapitulate the gross fermentation properties of the mutant:

	Cla^s (wild type)		Cla^r	
	A	G	A	G
glucose	+	+	+	–
mannitol	+	+	+	+
formate		+		+
(pyruvate)		+		–

I have not yet rechecked the nutrition of W-2754. It ought to be a prototroph.

Yours sincerely,

Joshua Lederberg

P.S? I found the enclosed red tag in my coat packet: it probably belongs to the Union coat rack.

JL